

Response to Comments from the Environmental Protection Agency
Submitted November 18, 1982 *92 we*

EPA #1 General Comment 2: "... many of the IHSS outlines used in this work plan are different in size and/or location from what is shown in the HRR and previous documents. Therefore, all changes made in this work plan to IHSS locations from previous demarcations of the IHSSs must be clearly identified, documented and justified. "

Response Evaluation.* Changes have been made in the formal work plan to all IHSS locations except to IHSS 158, the northern extent of which is still approximately 150 feet south of the originally mapped boundary. No justification could be found for this discrepancy in the work plan. Unless justification can be provided, the boundary of IHSS 158 must be extended approximately 150 feet north to agree with the previously mapped location for this site.

RESPONSE EPA #1: The IHSS boundaries in the work plan conform to the Historical Release Report for the Rocky Flats Plant dated June 1992. The IAG IHSS boundary was found to be inaccurate because documentation has shown that the probable releases at the site occurred before the addition to Building 551 was built in 1986 which more than doubled the size of the building. The IAG IHSS boundary was drawn from the present outline of the building instead of from the building as it was configured when the releases occurred. Figure 6-4 in Section 6 shows this revised boundary and is consistent with the Hazardous Release Report (July 1992).

EPA #2 EPA General Comment 4: The Stage 2 sampling effort does not appear to be well thought out, in regard to Stage 2 activities. It seems that ground water (and soil) screening samples need to be collected using a hydraulic probing rig and small diameter probes (approximately 1") prior to drilling any boreholes to further delineate any contamination detected from the stage 1 surveys. Only after these data are analyzed and mapped should boreholes be located and drilled. In addition, some of the boreholes would need to be completed as monitoring wells immediately. The proposed plan does not mention completion of any Stage 2 boreholes as monitoring wells.

Response Evaluation.* The fact that the subsurface materials are cobblely and thus may inhibit¹ the use of small diameter probing rods is a valid concern, however this technique is planned for use in OU 12. If for some reason the fieldwork at OU 13 does not occur as scheduled, it would be worthwhile in the meantime to determine the feasibility of such a method by either evaluating its success at OU 12 or by testing it independently at a few locations in OU 13. Certainly it would be more cost effective to define the extent of subsurface soil and ground water contamination using such a technique prior to placement of boreholes (in Stage 3) that would be optimally located and completed as monitoring wells. More comments regarding the use of ground water screening techniques and completion of

* Response Evaluation is provided by the EPA to how comments they made on the Draft OU 13 Work Plan were answered in either the original response to comments or in the Final Work Plan.

monitoring wells are found in the technical review section.

RESPONSE EPA #2: We agree, lessons learned at any of the industrial area OUs (and any remedial investigations at Rocky Flats for that matter), will be incorporated into the field sampling program by amendment or technical memorandum if appropriate. Section 6.3.2 has been modified to allow for the completion of monitoring wells in Stage 2.

EPA #3 EPA General Comment 4. Although on page 2-18 (page 2-58 in this version) it is stated that: "Additional wells are needed that penetrate the bedrock to a depth deep enough to evaluate the presence of the No. 1- Sandstone," no details could be found in the field sampling plan that specified this type of activity. It is necessary to drill approximately 15' to 25' of bedrock in at least five different locations to make such an evaluation.

Response Evaluation.* Drilling only six feet into bedrock is not sufficient to completely evaluate the presence of the No. 1 Sandstone. This is supported by the fact that none of the wells presently existing in OU 13 have encountered this sand body and none have penetrated more than 10' of bedrock. Therefore it is necessary to drill approximately 15' to 25' of bedrock in at least five different locations that would be most likely to encounter this sandstone, in addition to the routine six foot penetration elsewhere. There should also be a provision to complete one or more monitoring wells in the No. 1 Sandstone, if it is encountered and contaminants are determined to be present. Also see specific comment 12.

RESPONSE EPA #3: The original comment was directed at completing the geologic characterization at the OU. This is not necessarily needed if the bedrock below the alluvium is claystone and continuous for at least six feet. If in that six foot interval a sandstone unit is present, drilling would need to be continued at least six feet into the next claystone. The requirement to complete at least five of the wells to a depth 15'-25' below the upper bedrock surface is a function of local stratigraphy. Provisions for this drilling and to locate monitoring wells are the function of the Technical Memorandums to be developed after additional information is gathered in Stage I and Stage II. These are described in some detail in the Revised Field Sampling Plan (Section 6).

EPA #4 EPA General Comment 4: The Stage 3 investigation does not include any surface water or sediment sampling. These media must be evaluated in determining the extent of OU-13 contaminants. Information from ongoing "routine" monitoring, samples from other OU investigations, or additional sampling needed to provide the information required to support this determination must be identified.

Response Evaluation.* The response that surface water and sediment sampling will be conducted as part of the RFP integrated sampling plan is not adequate, since that plan is not yet developed and available for review. This is one of several aspects of the final work plan which indicate that it is not yet complete.

RESPONSE EPA #4: The concept of an Integrated Surface Water and Sediment Sampling Plan was presented and approved in the OU 12 Work Plan. Section 6— Revised Field Sampling Plan is consistent with that effort. All of the industrial area OU managers are working together to insure that efforts are coordinated and designed to meet the goals and objectives presented in the individual work plans. The Integrated Surface Water and Sediment Sampling Plan will be submitted to the agencies for review, comment and approval prior to the start of any field studies.

EPA #5 EPA General Comment 4: Surficial soil samples and depth profile samples must be collected at a subset of the High Purity Germanium (HPGe) survey locations and analyzed to evaluate the vertical extent of radionuclide contamination.

Response Evaluation*. The information presented in the response does not correspond to the information added to the text of the report. The response indicates that surficial soil samples and depth profile samples will be collected at a maximum of three boreholes, which would certainly not be sufficient. The final work plan does specify the number of surficial soil samples by IHSS but only indicates that depth profile samples may be collected if they are determined to be needed. Also see general comment 2 and specific comment 8.

RESPONSE EPA #5: Specific locations of the vertical profile analysis can only be identified after the results of the HPGe survey are known. The total number of profiles required to supplement the HPGe is a function of the variability between the measurements obtained, therefore the text in Section 6.3.1 has been revised accordingly.

EPA #6 EPA Specific Comment 27: Table 5.4. Under radionuclides, this table must also include the detection/quantitation limits for strontium 89/90, strontium 90, cesium 137, radium 226, and radium 228, all of which are proposed analyses listed in the text on page 5-12.

Response Evaluation:* All radionuclides on Table 5.3 (previously Table 5.4) have been deleted. This omission must be corrected.

RESPONSE EPA #6: The radionuclides portion of Table 5.3 was inadvertently omitted and has been included.

EPA #7 EPA Specific Comment 34: The soil gas survey proposed for this IHSS (152) must be extended down gradient in order to better investigate the presence of potential subsurface fuel oil contamination. By limiting the extent of the survey to the IHSS boundary, the location of such contamination may not be covered.

Response Evaluation:* Additional sampling points have been added, but the response indicates that if soil gas analyses indicate movement past these points, additional sampling will be conducted in Stage 3. Since the soil gas survey is a real time data collection method, it seems that additional sampling would be best conducted during Stage 1. This would also apply to

similar situations at other IHSSs.

RESPONSE EPA #7: If the soil gas analysis indicate that contaminants have moved past an IHSS boundary, the grid will be expanded to follow the plume as we have previously committed. However, if the plume appears to be entering an IHSS from a different OU, investigations will be suspended until the work plan needs of that particular OU are evaluated so we can optimize investigations. We agree that unless there are extraordinary circumstances that the soil gas analysis should proceed in Stage I. Any departure from that methodology will be discussed with the regulators and presented in the appropriate Technical Memorandum. The text in several places(for example, see section 5.1.2.5.2) has been modified to clarify this point.

EPA #8 EPA Specific Comment 35: Last paragraph. It is stated here and elsewhere in the work plan that surficial soil samples will only be taken at the location of each borehole. This is certainly not sufficient in either size or distribution to characterize the nature and extent of contamination in surficial soils for this OU. A more extensive approach must be added to the FSP that also discusses and justifies the frequency of surficial soil sampling.

Response Evaluation:* The response on the review and comment form states: "The sample spacing will be 20 feet where possible contaminant release sizes were small and greater than 20 feet where releases were larger or dispersed." The text of the work plan states that surficial soil samples will be collected on a 120-foot grid spacing. The correct grid spacing should be listed in both the review and comment form and the work plan.

RESPONSE EPA #8: Section 5, Data Quality Objectives and Section 6, The Revised Field Sampling and Analysis Plan have been revised to provide a statistically defensible program. This revision includes the rationale and approach to a two stage sampling program based on probability in which grids are not used in the same way they were in the earlier FSAP.

EPA #9 The spacing for the surficial soil samples is designated as 120 feet. The rationale for selecting this grid spacing must be provided. It was not explained in Section 5.1.2.4 as referenced. In addition, a review of the proposed sampling location maps for each IHSS revealed that the field sampling did not comply with the 120-foot spacing for all surficial soil samples. Deviations from the chosen grid spacing and an explanation for each deviation should be provided for each IHSS.

RESPONSE EPA #9: See comment and response EPA #8 above.

EPA #10 Surficial soil and vertical profile samples analyzed for radionuclides are proposed to be collected at a subset of HPGe locations to confirm the HPGe results and provide information on radionuclide distribution with depth. However, the descriptions of field activities at the individual IHSSs state that vertical profile samples may be taken depending on the results of

the HPGe survey. Because radionuclide distribution with depth can be ascertained only with vertical profile samples, these samples must be collected for a specified subset of the locations.

RESPONSE EPA #10: Please refer to the changes that have been made to Chapters 5 and 6 in the Work Plan. First, the DQO's for the Stage 1 have been clarified. Stage 1 radiologic investigations are designed to screen the surface for radioactive contamination. (This is apparent from the requirements in the IAG to perform a FIDLER survey of the areas.) Much like the FIDLER, only more precise, the HPGe will be used to measure gamma radiation from a planer surface. These measurements can accurately report the presence and level of radioactive contamination on the surface by isotope. The vertical profiles are needed to confirm the distribution of the radionuclides in the top few inches of soil to ensure that the assumptions used to set up the instrument are accurate. Because the number of vertical profiles required to do a statistical comparison is based on the variability of the results of the survey, the locations cannot be known until the survey is completed. The soil profiles are not used to characterize the nature and extent of contamination. Stage II and III activities are designed to meet those objectives. During Stages 2 and 3, boreholes will be located based on the results of the HPGe and surficial soil surveys to determine the nature and extent of the contamination. Please see Sections 5.1.2.4- 5.1.2.5.6.

EPA #11 Section 2.2 describes the existing analytical data for OU-13 and compares them to background. Anything detected in concentrations above background levels may be a potential contaminant. The data are then related to the nature and extent of contamination at each IHSS. In most instances, the text states, the detected contaminants could not be attributed to an IHSS. This information and the historical activity descriptions were then used to create Table 5.2, Potential Contaminants Present in each OU-13 IHSS. However, Table 5.2 does not always correlate to the discussion in Section 2.2. For some IHSSs, some contaminants detected above background are not included on Table 5.2.; for example strontium 89/90 at IHSSs 1171. and 117.2. In addition, some potential contaminants that are suspected from historical descriptions are not included on Table 5.2.; for example, diesel fuel and gasoline at IHSS 171. To resolve this observed inconsistency in reporting potential contaminants, the rationale for including or excluding contaminants should be provided. Until all potential contaminants are correctly specified for each IHSS, an assessment of the screening methods' ability to detect such contaminants cannot be completed.

RESPONSE EPA #11: Table 5.2 has been revised and renumbered. It is now Table 5.3 Strontium 89/90 has been added to the list for IHSSs 117.1 and 117.2, Gasoline and Fuel oil have been included for IHSS 171.

EPA #12 Page 6-19, Table 6.3: Several of the standard operating procedures (SOPs) listed on this table are under development. These SOPs must be approved by EPA before field work begins at OU-13. The procedures for collecting samples in the field must be clearly specified in the work plan or SOP to avoid confusion or problems in the field.

RESPONSE EPA #12: We agree. The following SOPs are being revised or are in development and will be submitted to the CDH and EPA for approval before field work in OU 13 begins:

- **Vertical Soil Profiles for the HPGe**
- **Collection of Surficial Soil Samples (per Technical Memorandum No. 5 for OU 1)**
- **Collection of Surficial Soil Samples Below Paved Areas**
- **Asphalt Sampling and Analysis**

This commitment is reiterated in the text of the OU 13 Work Plan where the applicable procedure is referenced.

EPA #13 Page 6-24 Paragraph 4: The tripod-mounted HPGe radiological surveys proposed for OU-13 provide soil concentration results representing a 23-foot diameter circular area. The OU-12 work plan says the tripod-mounted HPGe will represent a 45-foot circular area. The height of the tripod mount must be listed in this paragraph so that the area of coverage is correctly known.

Response EPA #13: The mast or tripod height does govern the radius of measurement based on the homogeneity of the radioactive constituents within the sample area. Section 6.3.1. includes this information in Table 6-5.

EPA #14 Page 6-35. Paragraph 2: In paved areas, the HPGe instrument will be set directly over a small opening in the pavement. This method will work but it will provide information only on that 4- to 8-inch square area. A 20-foot grid spacing was also chosen because, according to Gilbert (1987), this results in an acceptable probability of not finding an elliptical contaminated area approximately 16 feet by 32 feet in size. The relative size of contaminated paved areas at each IHSS in OU13 must be compared to this 16 feet by 32 feet ellipse to determine if this spacing is adequate to detect contamination. It should also be noted that in response to a CDH comment, it is stated that the HPGe survey spacing in paved areas would be 10 feet to account for the limited area of detection. The choice of a grid spacing for HPGe survey should be reevaluated and a proper rationale provided.

RESPONSE EPA #14: As stated in the Response to comment EPA # 9, both Section 5 (DQO's) and Section 6 (Field Sampling and Analysis Plan) have been revised to address these problems.

EPA #15 Page 6-35 and 6-36. last sentence: It is stated here that locations of vertical profile samples will be chosen some time after the HPGe survey is conducted. Since the HPGe provides real time data, time and money can be saved by collecting these samples at the time

the survey is at run by choosing those points where readings are greatest for vertical profile samples.

RESPONSE EPA #15: See comment EPA # 10 above.

EPA #16 Page 6-41. Paragraph 4: The chosen 40-foot spacing for the soil gas survey at IHSS 117.3 is not appropriate for the size of possible releases that occurred here. 20-foot spacing is needed to adequately identify any existing contamination.

RESPONSE EPA #16: We disagree. Although the IAG requires a 100' offset grid, we chose a 40' grid to locate spills that were estimated in the hundreds of gallons. This should be more than adequate to locate any residual contamination from the large spills. A twenty foot grid would come very close to providing 100% coverage of the area investigated. In light of the size of the reported spills, we feel that type of coverage is not needed at this time. In addition, we have committed to follow any contamination that is detected until we know how far it extends. Please see Section 5.1.2.5.2.

EPA #17 Page 6-45. Figure 6-6: This figure shows two of the three surficial soil samples to be located north of Sage Ave. and none located on the south side of the street. Since more than half of this IHSS is located south of Sage Ave., at least one surficial soil sample must be south of the street, within the boundary of this IHSS.

RESPONSE EPA #17: See Response EPA #8 above. The location of the first stage of surficial soils sampling will be determined as outlined in the work plan in Section 5.1.2.5.3. As part of the conservative bias that we are trying to achieve, we should first perform the visual inspection and the HPGe survey to locate sampling points. If there are any sampling points remaining from the 11 slated for this IHSS group, random assignment of the remaining sampling points may result in an additional point(s) located on the south side of the street. We will present those sampling locations to the regulatory agencies for their concurrence prior to sampling. A revised Figure 6-6 does show sampling points on both sides of the street, but as explained here and in the text, those locations could be altered as a result of the visual inspection and HPGe survey. Please see Sections 5.1.2.5.3, 6.3.1.4 and Figure 6-6.

EPA #18 Page 6-50. Figure 6-8: Based on historical descriptions of potential releases from building 123 and the apparent eastward direction of groundwater flow in the area of IHSS 148, it seems unnecessary to conduct any sampling to the west of this building. Of course if soil gas and radiometric surveys indicate that the presence of contamination may extend to this area, the surveys should be conducted to define the limits of its extent.

RESPONSE EPA #18: We agree and have incorporated these changes into the Revised Field Sampling Plan. Please see Section 6.3.1.6 and Figure 6-8.

EPA #19 Page 6-66. Figure 6-11. This figure indicates that the uppermost two foot interval of boreholes will not be sampled for laboratory analysis of metals, radionuclides or semi-volatiles. This would leave a data gap between the surface scrape sample and the composite sample taken between two and eight feet. It is recommended that a composite sample of the top two foot interval also be taken and analyzed for TAL metals, TCL semi-volatiles, and radionuclides, in order to provide a sufficient vertical profile of the extent of these potential contaminants.

RESPONSE EPA #19: We agree that there could be a data gap. These analytes will be added if they are present in the Stage I results. Figure 6-11 has been revised.

EPA #20 Page 6-66. Paragraph 3: It is stated here that ground water samples collected from boreholes using the Hydropunch technique will only be taken at those locations determined to have the highest level of contamination detected in the Stage 1 surveys. In order to confirm the presence or absence of contamination in ground water and to provide essential data for optimal placement of monitoring wells, it is necessary to sample the ground water using this or other techniques in all boreholes. If a particular boring is already scheduled to be completed as a monitoring well based on existing knowledge of ground water contamination at the location, Hydropunch ground water samples would not be needed.

RESPONSE EPA #20:

We agree. These changes have been incorporated into the Revised Field Sampling Plan. Please see section 6.3.2.

EPA #21 Page 6-66 and 6-67. last and first Paragraphs: The criteria and rationale for determining which boreholes will be completed as monitoring wells is not stated here. If all boreholes will be plugged and abandoned upon completion of all sampling activities, how will the decision to complete them as monitoring wells be made at that time without sample analysis results? This is where subsurface soil and ground water screening techniques can be very useful and effective in optimizing the timing of completion and placement of monitoring wells.

RESPONSE EPA #21: We agree. These changes have been incorporated into the Revised Field Sampling Plan. Please see section 6.3.2.

EPA #22 Page 6-71. Paragraph 1: This paragraph states that the 20-foot spacing for the HPGe survey will provide approximately 90 percent coverage of an area. This is incorrect, as a 20 foot spacing with a 23 foot field of view will actually provide 100 percent coverage of an area. This statement should be rewritten based on this comment and specific comment number 3.

RESPONSE EPA #22: We agree. This comment was considered in the revision of the Field Sampling and Analysis Plan. Please see Section 5.2.1.5.1 and Table

6.5 Please also refer to Comment EPA # 14.

EPA #23 Page 6-73. Paragraph 3: It is stated here that boreholes will be drilled to the water table or six feet into bedrock, whichever comes first (unless they are planned as monitoring wells). The maps and cross sections provided in Section 2 of this work plan show the water table as being above the top of bedrock throughout OU 13. Therefore if boreholes are drilled in accordance with this statement, it is highly unlikely that any would penetrate bedrock. This also contradicts the statement on page 6-64 that says all boreholes will be drilled six feet into bedrock. As discussed in comment 3 of section 2, in order to adequately characterize the subsurface geology at OU 13, all boreholes shall be drilled at least six feet below the top of bedrock and at least five boreholes need to penetrate 15' to 25' of bedrock.

RESPONSE EPA #23: We have rewritten Section- 6 and incorporated these observations into the revised FSAP. However, we are not committing to drill at least five boreholes to 15-25 feet into bedrock. If additional geologic characterization is needed, those needs and proposed solutions can be addressed in the appropriate Technical Memorandum. See response to comment EPA #3 above.

EPA #24 Page 6-80. Table 6.5: This table does not list the sample container requirements for all of the proposed soil samples. Container requirements for laboratory HPGe analysis, asphalt laboratory HPGe analysis, and nitrate, chloride and sulfate analyses should also be listed on this table.

RESPONSE EPA #24:

Table 6.5 has been revised to include these requirements.

EPA #25 Page 7-1 and Figure 7-1: As this is the final version of the work plan, a final schedule is needed that will detail when an subtasks of the RFI/RI will begin and end. Therefore, the word "preliminary" must be deleted from the first and second sentences of page 7-1 and actual beginning and ending dates must be added to Figure 7-1 for each identified activity.

RESPONSE EPA #25: Page 7-1 and Figure 7-1 have been revised.